

ACCELEROMETER

ABSTRACT

An accelerometer. A silicon wafer is etched to form a fixed portion, a movable portion, and a resilient coupling between, the fixed and movable portions generally arranged in the plane 5 of the wafer, the mass of the movable portion being concentrated on one side of the resilient coupling. One of the fixed and moveable portions of the silicon structure includes a first electrode. The other of the fixed and moveable portions includes a second electrode oriented parallel to the axis of acceleration, and an electrically-conductive layer electrically connected as a third electrode coplanar and mechanically coupled with the second electrode. The second and 10 third electrodes are arranged in capacitive opposition to the first electrode, the capacitance between the first electrode and third electrode increasing as the movable portion moves in a direction along the axis of acceleration relative to the fixed portion and decreasing as the movable portion moves in an opposite direction. A resilient coupling retains the first and third electrodes in capacitive opposition to each other across a capacitance gap while allowing motion of the first electrode relative to the second and third electrodes in response to acceleration along an axis of acceleration perpendicular to the plane of the wafer, and resiliently restores the first electrode to an equilibrium position when the acceleration ceases. The second electrode is in opposition to a majority of the surface area of the first electrode when the electrodes are in the equilibrium position. Capacitance between the first and third electrodes is measured to obtain a measurement of acceleration along the axis.